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on the invention entitled
METHOD OF AND SYSTEM FOR
PROVIDING PARALLEL MEDIA GATEWAY

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METHOD OF AND SYSTEM FOR PROVIDING PARALLEL MEDIA GATEWAY

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to the field of computer networking technologies and applications and more particularly, relates to multimedia broadcasting over the global computer network known as the Internet.

2. Description of the Prior Art

In recent years, there has been a great expansion of the use of global computer networks such as the Internet. As one of the important areas of development, many technologies have been introduced for multi-media broadcasting over the Internet.

The following twelve (12) prior art patents are found to be pertinent to the field of the present invention:

1. United States Patent No. 5,170,252 issued to Gear *et al.* on December 8, 1992 for "System And Method For Interconnecting And Mixing Multiple Audio And Video Data Streams Associated With Multiple Media Devices" (hereafter "*Gear*");
2. United States Patent No. 5,608,447 issued to Farry *et al.* on March 4, 1997 for "Full Service Network" (hereafter "*Farry*");

3. United States Patent No. 5,650,994 issued to Daley on July 22, 1997 for
“Operation Support System For Service Creation And Network Provisioning For
Video Dial Tone Networks” (hereafter “*Daley*”);
4. United States Patent No. 5,793,770 issued to St. John *et al.* on August 11, 1998
for “High-Performance Parallel Interface To Synchronous Optical Network
Gateway” (hereafter “*St. John*”);
5. United States Patent No. 5,856,973 issued to Thompson on January 5, 1999 for
“Data Multiplexing In MPEG Server To Decoder Systems” (hereafter
“*Thompson*”);
6. United States Patent No. 5,917,537 issued to Lightfoot *et al.* on June 29, 1999 for
“Level 1 Gateway For Video Dial Tone Networks” (hereafter “*Lightfoot*”);
7. United States Patent No. 5,925,100 issued to Drewry *et al.* on July 20, 1999 for
“Client/Server System With Methods For Prefetching And Managing Semantic
Objects Based On Object-Based Prefetch Primitive Present In Client’s Executing
Application” (hereafter “*Drewry*”);
8. United States Patent No. 5,978,567 issued to Rebane *et al.* on November 2, 1999
for “System For Distribution Of Interactive Multimedia And Linear Programs By
Enabling Program Webs Which Include Control Scripts To Define Presentation
By Client Transceiver” (hereafter “*Rebane*”);
9. United States Patent No. 6,073,160 issued to Grantham *et al.* on June 6, 2000 for
“Document Communications Controller” (hereafter “*Grantham*”);

- 1 10. United States Patent No. 6,085,235 issued to Clarke, Jr. *et al.* on July 4, 2000 for
2 “System For Parsing Multimedia Data Into Separate Channels By Network Server
3 In According To Type Of Data And Filtering Out Unwanted Packets By Client”
4 (hereafter “*Clarke*”);
5
6 11. United States Patent No. 6,128,653 issued to del Val *et al.* on October 3, 2000 for
7 “Method And Apparatus For Communication Media Commands And Media Data
8 Using The HTTP Protocol” (hereafter “*del Val*”); and
9
10 12. United States Patent No. 6,151,634 issued to Glaser *et al.* on November 21, 2000
11 for “Audio-On-Demand Communication System” (hereafter “*Glaser*”).
12

13 *Gear* discloses a system having a pipeline comprised of a multi-channel bi-directional
14 video bus, multi-channel bi-directional audio bus, and a digital interprocessor communications
15 bus. The pipeline is constructed on a motherboard printed circuit board that additionally contains
16 a microprocessor that serves as the local area network controller for the interprocessor
17 communications. A software driver interconnects the multiple video and audio devices in
18 different configurations in response to user inputs to a host data processing system so that
19 physical assignments of the device communications on the pipeline are transparent to the user.
20 In this manner, a media device’s video input and output can be optionally connected to any of the
21 video pipes of the video bus. Similarly, the media device audio inputs and outputs can be
22 optionally connected to any of the audio bus pipes. The pipeline is equipped with a number of
23 ports where media controller (microprocessor) printed circuit cards can be connected, thus
24 providing a convenient method for connecting media devices to the pipeline. The switching is
25 accomplished through a pair of analog multiplexers whose connection options have been
26 commanded by local microprocessor resident on the media device microprocessor control board.
27 The local microprocessor receives instructions for the pipeline switch interconnections though
28 the interprocessor serial communications bus.

1 *Farry* discloses a digital switching network which accommodates a full range of
2 broadband and narrowband digital technologies, including video, wideband data, narrowband
3 data, video-on-demand and telephone channels in an integrated manner. A Level 1 gateway is
4 utilized to control access to all information resources on the network. A broadband ATM switch,
5 a digital cross-connect switch or other distribution mechanisms may be utilized to interconnect
6 information sources and subscribers. Optical fiber connects information sources to the switching
7 component of the network utilizing a standardized transport stream.

8
9 *Daley* discloses an operational support system which includes service creation ,service
10 activation and service control functions to provide on-line service activation for video
11 information providers (VIPs) and video information users (VIPs) on a video dial tone network.
12 The operational support system processes the remote request by verifying the request data with
13 internal subscriber databases, comparing the request with available network inventory and
14 provisioning network resources by generation requests to network elements to establish the new
15 service. The operational support system provides an open interface for VIPs to remotely
16 provision network resources by remotely accessing and requesting changes in corresponding VIP
17 profiles stored in the operational support system, in order to add/delete VIP subscribers, update
18 event schedules, and/or to download billing and usage statistics. The operational support system
19 also is adapted to perform network creation functions including initial network configuration,
20 logical assignment of network elements, initializing network element systems, assignment of
21 work orders for physical interconnections, and performance verification of installed systems.

22
23 *St. John* discloses a digital system for providing sending and receiving gateways for
24 HIPPI interfaces. Multiplexers route the data and overhead signals to a framer module which
25 allocates the data and overhead signals to a plurality of 9-byte words that are arranged in
26 a selected protocol. Electronic logic circuitry formats data signals and overhead signals in a data
27 frame that is suitable for transmission over a connecting fiber optic link. The formatted words
28 are stored in a storage register for output through the gateway.

1 *Thompson* discloses a method and device for communicating private application data,
2 along with audio data (e.g., MPEG-2 encoded audio data) and video data (e.g., MPEG-2 encoded
3 video data), from a first location to a second location. The multiplexed packets form a packet
4 stream which is communicated to the second location. The private application data is either
5 stuffed into a header portion of packets of encoded audio or video data, or packetized and
6 multiplexed with packets of encoded audio or video data.

7
8 *Lightfoot* discloses a Level 1 gateway in advanced digital networks for providing
9 selective point-to-point communications between subscribers terminals and broadband server
10 equipment operated by a plurality of independent information service providers. Routing
11 through the network is controlled by functionality identified as a level 1 Gateway. The Level 1
12 Gateway is itself an interactive device in that subscribers can input information and receive
13 display information from the Gateway to define or modify their own video dial tone service
14 through the network. It generates menus of providers, either as a function of providers available
15 through a particular portion of the network or in a customized fashion specified by individual
16 subscribers. It will also perform a variety of functions including communications port
17 management of transmissions of information between subscribers and servers, processing of
18 billing information and session management. The Level 1 Gateway further provide a PIN
19 number functionality, e.g. to permit parents to limit which providers their children can access.

20
21 *Drewry* discloses a client/server system and methods for managing object availability
22 through semantic object "load sets". By associating a particular "load set" with each object
23 which might be requested by a client, improved object fetching and cache management is
24 provided. Each "semantic object" is packaged in a "storable," which incorporates dependency
25 lists indicating the context in which the object is to be used (i.e., with which dependent objects).
26 With this approach, object availability in a distributed object environment (e.g., the Internet) is
27 improved. The related methods involve the steps for managing object fetching and discarding on
28 a per object basis, not on a per page basis.

1 *Rebane* discloses a system and method for delivering multimedia interactive and linear
2 programming on a large-scale network. The methods are for efficiently using system resources
3 such as bandwidth, storage and processing time to maintain an optimally-performing system that
4 results in minimal latency for the end-user's interaction with the system. The stored program
5 material is segmented into portions and each program segment is transmitted to the receiving
6 system component in less than real-time on an as-needed basis. The system is designed to be
7 hierarchical in nature in order to avoid the huge processing and storage requirements of a system
8 utilizing centralized storage and system control.

9
10 *Grantham* discloses a method and apparatus for providing a general-purpose,
11 multifunction, individually addressable, full-bandwidth bi-directional communication device
12 with built-in Authentication, Authorization, and Accounting (AAA) capabilities that connects a
13 home or business user with ATM and other Switched broadband digital networks in a
14 convenient, adaptable, extensible manner at reasonable cost. The device can be used in a
15 heterogeneous environment and with different types of networks and protocols. The full-
16 bandwidth bi-directional communication and built-in AAA capabilities of the device distinguish
17 it from other "set-top boxes." The device supports a Document Services Architecture and, in
18 particular, supports agent-based communications to ensure well-behaved communications and
19 fair allocation of network resources among users.

20
21 *Clarke* discloses a system for parsing multimedia data into separate channels by network
22 servers connected to a network. The server process examines the information packets sent from
23 the service provider to determine zero or more of the categories that describe a content of the
24 information packet and labels the information packets with the channel identifier associated with
25 the respective categories prior to sending the information packets over the network. The
26 server/control function executes a process which parses the information content sent from the
27 service provider onto two or more channels and then broadcasts those channels over the network
28 to a plurality of client computers.

1 *del Val* discloses a method for employing a Hypertext Transfer Protocol (HTTP protocol)
2 for transmitting streamed digital media data from a server which is configured for coupling to a
3 client computer via a computer network. The method includes receiving at the server from the
4 client an HTTP POST request. The POST request requests a first portion of the digital media
5 data and includes a request header and a request entity-body. The request entity body includes a
6 media command for causing the first portion of the digital media data to be sent from the server
7 to the client. The method further includes sending an HTTP response to the client from the
8 server. The HTTP response includes a response header and a response entity body. The
9 response entity body includes at least a portion of the first portion of the digital media data.

11 *Glaser* discloses an audio-on-demand communication system providing realtime
12 playback of audio data transferred via telephone lines or other communication links. One or
13 more audio servers include memory banks which store compressed audio data. High quality
14 audio data compressed according to lossless compression techniques is transmitted together with
15 normal quality audio data. Alternatively, metadata, or extra data, such as text, captions still
16 images, etc., can also be transmitted with audio data and is simultaneously displayed with
17 corresponding audio data. Furthermore, servers and subscriber PCs are dynamically allocated
18 based upon geographic location to provide the highest possible quality in the communication
19 link. At the request of a user at a subscriber PC, an audio server transmits the compressed audio
20 data over the communication link to the subscriber PC. The subscriber PC receives and
21 decompresses the transmitted audio data in less than real-time using only the processing power of
22 the CPU within the subscriber PC. The audio-on-demand system provides a table of contents
23 indicating significant divisions in the audio clip to be played and allows the user immediate
24 access to audio data at the listed divisions.

26 While many systems and method for providing multi-media contents over a computer
27 network system have been introduced, there are still many problems to be addressed and new
28 needs to be satisfied.

1 For example, streaming video has become an important media platform. It provides a
2 low-bandwidth proxy for the interactive television services that will enjoy wide deployment over
3 the next few years. However, as the number of large-scale streaming events increases, a basic
4 limitation of this platform has become apparent: public access, particularly to live events, is on
5 a first-come, first-serve basis. While it is inherently feasible to reserve bandwidth on a private
6 network for specific types of content, and thereby limit the absolute number of viewers,
7 guaranteeing public access is a function of not only bandwidth but also server resources. It is
8 therefore important to allocate these resources in a manner that identifies priority viewers
9 wherever possible.

11 Recently many web sites began to offer dynamic content by allowing registered visitors
12 to receive items such as local news stories and sports scores on personalized home pages. By
13 specifying topics of interest, these visitors become subscribers to real-time messages broadcast
14 by wire services and other publishers of information. This publish-subscribe paradigm has
15 become a key element of successful Web applications.

17 Publish-subscribe may be used to build a priority viewer base for streaming video.
18 Binding viewer-specific messages to the stream permits real time notification of cue points.
19 These cue points can relate to start and stop times, as well as to meta-data describing the topical
20 content of the multicast event. Publish-subscribe can also enable reservation of video server
21 threads. By using viewer-specific identifiers, from the client on the software level and from the
22 network endpoint on the hardware level, content delivery networks can offer prioritized viewing.

24 Multicast viewers are also a prime target market for concurrent network services,
25 specifically telephony. Viewers in many vertical markets such as sports and entertainment are
26 very likely to access conference call services where available. Certain real-time collaboration
27 software currently offer concurrent data and voice conferencing, but these features have not yet
28 been incorporated in a message-driven streaming video context.

1 It is desirable to provide a new method and system for providing a parallel media
2 gateway that offers an event driven, message oriented video stream broadcasting scheme with
3 parallel telephony exchange of digital audio streams with self provisioning content.
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SUMMARY OF THE INVENTION

The present invention is a method of and system for providing a parallel media gateway that offers an event driven, message oriented video stream broadcasting scheme with parallel telephony exchange of digital audio streams with self provisioning content.

Described generally, the present invention includes a method for providing a parallel media gateway over the Internet. The method includes the steps of establishing and maintaining a server connected to the Internet and accessible by a user at a data endpoint for receiving customized request of data streams from the user, and obtaining data streams requested by the user from a stream server also connected to the Internet, and providing the user with the requested data streams via the Internet.

The method implements a parallel media gateway protocol for ingesting meta-data tags in real-time into the data streams requested by the user, and encodes the data streams with self provisioning content in real-time. The method also provides a back channel communication between the user and the stream server over the Internet for facilitating real-time semantic search of data streams by the user.

Furthermore, the method includes the steps of establishing connection with a telephony infrastructure for receiving telephony audio signals and digitizing the audio signals, to enable the user to interact with others through telephony endpoints linked to the telephony infrastructure while retrieving event driven, message oriented data streams via the Internet.

Further novel features and other objects of the present invention will become apparent from the following detailed description, discussion and the appended claims, taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring particularly to the drawings for the purpose of illustration only and not limitation, there is illustrated:

FIG. 1 is a simplified block diagram of a system for providing a parallel media gateway via the Internet in accordance with an exemplary embodiment of the present invention;

FIG. 2 is a simplified block diagram showing a parallel media gateway platform in accordance with an exemplary embodiment of the present invention; and

FIG. 3 is a flow chart diagram that illustrates an exemplary method for providing a parallel media gateway over the Internet in accordance with an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Although specific embodiments of the present invention will now be described with reference to the drawings, it should be understood that such embodiments are by way of example only and merely illustrative of but a small number of the many possible specific embodiments which can represent applications of the principles of the present invention. Various changes and modifications obvious to one skilled in the art to which the present invention pertains are deemed to be within the spirit, scope and contemplation of the present invention as further defined in the appended claims.

The present invention is directed to a method and system for providing a parallel media gateway over the Internet, which provides a platform consisting of a parallel media gateway application server that is accessible by a browser-based client via the Internet. The server's core application program is written in the Extensible Markup Language (XML). It uses the XML-based protocol to communicate with the client. The client's interface is rendered by, for example, using Macromedia Flash 5, which has built-in XML messaging capacity.

Referring to Figure 1, there is shown a simplified block diagram of the present invention system for providing a parallel media gateway (PMG) over the Internet. The present invention PMG server 10 is connected via the Internet to a web hosting server 20, and also to a stream server 30 through a stream encoder 32. The PMG server 10 and stream encoder 32 are further connected to a telephony infrastructure 40. The telephony infrastructure 40 is connected with a multiplicity of telephone end points 42. The web server 20 is accessible via the Internet by a multiplicity of users at data end points 50.

Referring to Figure 2, there is shown a simplified block diagram of main components of the present invention PMG 10. The platform of the present invention PMG may include a topic bus 62, an event bus 64, a video animation 66 and an audio telephony 68. These components are

1 communicating using a desired protocol 70 with an infrastructure 80. The protocol 70 used for
2 communicating with the infrastructure 80 can be any suitable protocol, such as an (RTSP) 72, an
3 (RTP) 74, an (HTTP) 76 or a parallel semantic protocol (PSP) 78.

4
5 Referring to Figure 3, there is shown the basic steps of the present invention method for
6 providing a parallel media gateway over the Internet. Referring to Figures 1 and 3, the present
7 invention method for providing a parallel media gateway includes the following steps:

8
9 A: A web client at a data end point 50 logs into web server 20. Web server 20
10 connects to the PMG 10 which determines the device, type, location and other realtime attributes
11 of the client. The client also requests custom data stream from stream server 30.

12
13 B: The client receives updated profile, scheduling and Flash interface information
14 from PMG 10. Device interface constraints part of the XML scheme and the PMG protocol.

15
16 C: Text containing meta-data are either embedded realtime into the stream or sent via
17 a parallel stream. Data sources include text ingestion, pattern and color recognition of video,
18 speech recognition of audio including telephony, and other third party tools. The meta-data
19 protocol is the present invention PMG's XML-based framework.

20
21 D: Streams are encoded realtime or archives are served from the stream server 30.

22
23 E: The client communicates information regarding bandwidth and data flow directly
24 with the stream server 30 via the Internet, which in turn traps user interaction via applications
25 such as wordprocessors, calendaring, email, *etc.* It also facilitates realtime semantic search of
26 underlying media streams and includes voice/telephonic tags by locally encoding them for
27 addition to the stream (remote audio notation of media).

28

1 F: Audio from telephony endpoints 42 are digitized as separate files and archived for
2 selected or multiplexed playback.

3
4 G: Audio from telephony endpoints 42 is also available at PMG 10 for retrieval by
5 the client via the Internet.

6
7 H: The PMG 10 provides the interaction with telephony endpoint 42 through its
8 connection with telephony infrastructure 40 of public exchange (PBX) services.

9
10 I: The PMG 10 provides user interaction between the web client at data endpoint 50
11 and telephony endpoint 42 when supported by endpoint features such as cell phone rings with
12 voice/audio while embedded Web browser shows data.

13
14 The services offered by the present invention platform are in compliance with the
15 standards and business-to-business (B2B) specifications of the Universal Description, Discovery
16 and Integration (UDDI) Business Registry.

17
18 Complying with this standard enables the present invention PMG platform to provide a
19 value chain with many important components, including:

20
21 1. Meta-tagging: the server can expose its ability to bind topic tags to streaming
22 content. The server can communicate in real-time with an encoder to produce a stream capable
23 of messaging potential viewers. Using XML and Simple Object Access Protocol (SOAP), the
24 server can access the encoder in a transparent way.

25
26 2. Telephony: the server can integrate a message-carrying stream with telephony
27 infrastructures to provide new application services. Potential viewers can be called automatically
28 at certain cue points within the stream, and can make conference calls with a pre-defined list of

1 other viewers. Internet telephony endpoints can bind with streaming media endpoints to enable
2 prioritized, Quality of Service (QoS) conferencing while viewing the stream video. Publish-
3 subscribe telephony network (PSTN) endpoints can be addressed by communicating with
4 multipoint control units (MCUs) using communications protocols such as Media Gateway
5 Control Protocol.

6
7 3. Archiving: the server can also drive selective archiving and retrieval of media
8 assets. For example, conversations between viewers of a Webcast can be recorded as separate
9 digital audio tracks. These tracks can be stored with the underlying video stream and tagged
10 with meta-data enabling the selective playback of those tracks along with the stream. The
11 filtered remarks of certain viewers can then be heard in isolation.

12
13 The present invention has many advantages. It provides an event driven, message
14 oriented video stream broadcasting scheme with parallel telephony exchange of digital audio,
15 *i.e.*, the provision of parallel audio/video streams with self provisioning content.

16
17 Defined in detail, the present invention is a method for providing a parallel media
18 gateway over a computer network, comprising the steps of: (a) establishing and maintaining
19 a server connected to said computer network and accessible by a user at a data endpoint for
20 ascertaining user information in real-time and receiving customized request of data streams from
21 the user; (b) obtaining data streams requested by said user from a stream server connected to said
22 computer network and providing said user with the requested data streams via said computer
23 network; (c) implementing a parallel media gateway protocol for ingesting meta-data tags in real-
24 time into said data streams requested by said user; (d) utilizing an encoder for encoding said data
25 streams with self provisioning content in real-time; (e) providing back channel communication
26 between said user and said stream server over said computer network for facilitating real-time
27 semantic search of data streams by said user; (f) establishing connection with a telephony
28 infrastructure through a public exchange service for receiving telephony audio signals, and

1 digitizing said audio signals; (g) providing digitized audio signals in parallel to said data streams
2 and archiving said digitized audio signals for playback; and (h) enabling said user to interact with
3 others through telephony endpoints linked to said telephony infrastructure while retrieving event
4 driven, message oriented data streams via said computer network.

5
6 Defined broadly, the present invention is a method for providing a parallel media gateway
7 over a computer network, comprising the steps of: (a) establishing and maintaining a server
8 connected to said computer network and accessible by a user at a data endpoint for receiving
9 customized request of data streams from the user; (b) obtaining data streams requested by said
10 user from a stream server and providing said user with the requested data streams via said
11 computer network; (c) implementing a parallel media gateway protocol for ingesting meta-data
12 tags in real-time into said data streams requested by said user; (d) encoding said data streams
13 with self provisioning content in real-time; (e) providing back channel communication between
14 said user and said stream server for facilitating real-time semantic search of data streams by said
15 user; (f) establishing connection with a telephony infrastructure for receiving telephony audio
16 signals and digitizing said audio signals; (g) providing digitized audio signals in parallel to said
17 data streams; and (h) enabling said user to interact with others through telephony endpoints
18 linked to said telephony infrastructure while retrieving event driven, message oriented data
19 streams via said computer network.

20
21 Defined more broadly, the present invention is a method for providing a parallel media
22 gateway over a computer network, comprising the steps of: (a) establishing and maintaining a
23 server connected to said computer network and accessible by a user for receiving customized
24 request of data streams from the user; (b) obtaining data streams requested by said user from a
25 stream server and providing said user with the requested data streams via said computer network;
26 (c) implementing a parallel media gateway protocol for adding self provisioning content in real-
27 time to said data streams requested by said user; (d) establishing connection with a telephony
28 infrastructure; and (e) enabling said user to interact with others through telephony endpoints

1 linked to said telephony infrastructure while retrieving event driven, message oriented data
2 streams via said computer network.
3

4 Of course the present invention is not intended to be restricted to any particular form or
5 arrangement, or any specific embodiment, or any specific use, disclosed herein, since the same
6 may be modified in various particulars or relations without departing from the spirit or scope of
7 the claimed invention hereinabove shown and described of which the apparatus or method shown
8 is intended only for illustration and disclosure of an operative embodiment and not to show all of
9 the various forms or modifications in which this invention might be embodied or operated.
10

11 The present invention has been described in considerable detail in order to comply with
12 the patent laws by providing full public disclosure of at least one of its forms. However, such
13 detailed description is not intended in any way to limit the broad features or principles of the
14 present invention, or the scope of the patent to be granted. Therefore, the invention is to be
15 limited only by the scope of the appended claims.
16

17 **WHAT IS CLAIMED IS:**
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